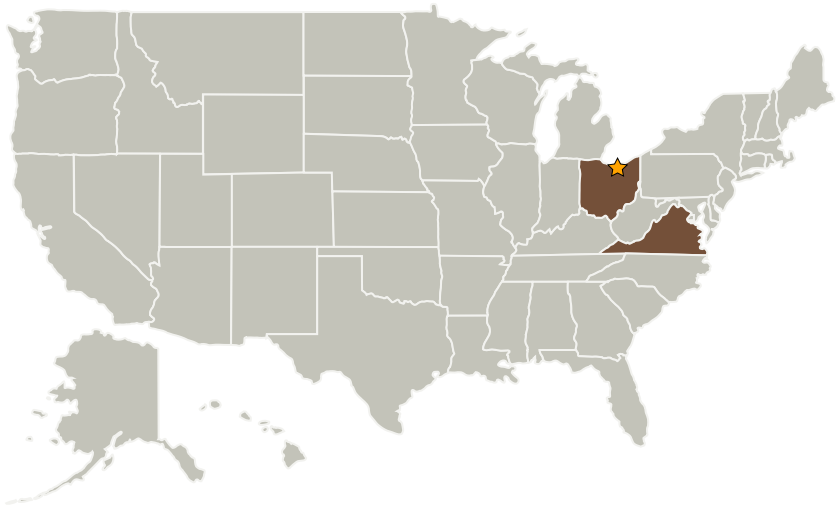
Quantum Dot Based Photovoltaics, Phase I

Completed Technology Project (2008 - 2008)

Project Introduction

Hybrid photovoltaic cells that combine nanostructured inorganic semiconductors with organic conductors such as the cell proposed, show promise for energy generation in technical applications due to the higher efficiencies and significantly lower costs resulting from cheaper materials and easier manufacturing processes. These hybrid solar cells can be tailored to have efficiencies comparable to inorganic solar cells hitherto studied. Quantum Dot (QD) semiconductor based photovoltaics exhibit promise for fabrication of lightweight and efficient sources of power, especially in conjugation with organic semiconductors. In this Phase I effort, Materials Modification Inc. will develop a novel CIGS quantum dot enhanced hybrid photovoltaic cell that exhibits promise of a conversion efficiency of 15-30% or even higher and good radiation resistance. MMI's proprietary plasma process will be used to produce the CIGS quantum dots, which will be incorporated in a suitable organic semiconductor to fabricate simple, cheap and efficient photovoltaics.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Materials Modification, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Fairfax, Virginia

Primary U.S. Work Locations	
Ohio	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Tirumalai Sudarshan

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic